

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-31 (**canceled**)

32. (New) A magnetic tape comprising multiple parallel diagonal tracks together storing (a) N data bytes divided into M sub groups, each of the subgroups having data bytes as well as C1 and C2 orthogonal redundancy coding bytes; and (b) a C3 error correcting sub group resulting from the M sub groups; each of the sub groups having P bytes; each pair of the parallel diagonal tracks together including one of the sub groups so that a first track of each diagonal track pair includes P/2 bytes of sub group i and a second track of each diagonal track pair includes the remaining P/2 bytes of sub group i, where $i = 1 \dots M$; the error correcting sub group being in an additional pair of the parallel diagonal tracks A and B; the bytes in tracks A and B having values resulting from byte k of the 2M tracks being combined; track j including a pair of further check bytes derived in accordance with the polynomial $X^2 + X\alpha^2 + \alpha$, where α is the primitive element $GF(2^8)$, X = the value of the byte k of track j, $j = 1 \dots 2M, A, B$ and $k = 1 \dots P/2$.

33. (New) The tape as claimed in claim 32, wherein said polynomial is generated by using a sub function having a mask function, said sub function for the byte k of track j being derived by:

shifting each byte k of track j by one bit to obtain a shifted byte k value;

setting the least significant bit of each shifted byte k to value 0; and

if the most significant bit of each byte k has a value 1, performing an exclusive OR of said shifted byte with the binary value 29.

34. (New) The tape as claimed in claim 33 wherein $M = 22$.

35. (New) A method of reading bytes stored in diagonal tracks, the tracks including (a) $2M$ tracks each storing (i) data bytes and (ii) C1, C2 orthogonal redundancy coding bytes, and (b) tracks A, B each storing C3 error correction bytes coded with a Reed-Solomon error correcting code, said method comprising the steps of:

reading said bytes from the $2M$ tracks, as well as tracks A,B; and

performing a check sum calculation on said bytes;

wherein said check sum calculation includes processing the bytes in track j in accordance with the polynomial $X^2 + X\alpha^2 + \alpha$, where $j = 1 \dots 2M, A, B$, α is the primitive element $GF(2^8)$, X = the value of byte k in track j, $j = 1 \dots 2M, A, B$, and $k=1 \dots Q$, Q = number of bytes in track j.

36. (New) The method as claimed in claim 35, wherein said polynomial is applied by using a

sub function having a mask function, said sub function for the byte k of track j being derived by:

reading the most significant bit of byte k of track j;

shifting each byte k of track j by one bit to obtain a shifted byte value;

setting the least significant bit of each shifted byte to value 0; and

if the most significant bit of each byte has a value 1, performing an exclusive OR of said shifted byte with the binary value 29.

37. (New) The method as claimed in claim 36 wherein $M = 22$.

38. (New) A method of writing data and error correcting bytes into multiple parallel diagonal tracks of a magnetic tape, the method comprising: dividing N data bytes into M sub groups, forming each of the subgroups so it has data bytes as well as C1 and C2 orthogonal redundancy coding bytes; and forming a C3 error correcting sub group from the M sub groups; each of the sub groups having P bytes; each pair of the parallel diagonal tracks together including one of the sub groups so that a first track of each diagonal track pair includes $P/2$ bytes of sub group i and a second track of each diagonal track pair includes the remaining $P/2$ bytes of sub group i, where i is $1 \dots M$; forming the error correcting sub group so it is in an additional pair of the parallel diagonal tracks A and B so the bytes in tracks A and B have values resulting from byte k of the 2M tracks being combined, track j including a pair of further check sum bytes derived in accordance with the polynomial $X^2 + X\alpha^2 + \alpha$, where α is the primitive element $GF(2^8)$, X = the value of byte k of track j, $j = 1 \dots 2M, A, B$ and $k = 1 \dots P/2$.

39. (New) The method as claimed in claim 38, wherein said polynomial is generated by using a sub function having a mask function, said sub function for the byte k of track j being derived by:

shifting each byte k of track j by one bit to obtain a shifted byte value;

setting the least significant bit of each shifted byte to value 0; and

if the most significant bit of each byte has a value 1, performing an exclusive OR of said shifted byte with the binary value 29.

40. (New) The method as claimed in claim 39 wherein $M = 22$.

41. (New) An apparatus for performing the method of claim 35.

42. (New) An apparatus for performing the method of claim 36.

43. (New) An apparatus for performing the method of claim 37.

44. (New) An apparatus for performing the method of claim 38.

45. (New) An apparatus for performing the method of claim 39.

46. (New) An apparatus for performing the method of claim 40.